

REMARKS**Summary of the Office Action**

The disclosure stands objected to for alleged informalities.

The abstract is objected to for exceeding the 150 word limit.

The drawings stand objected to because Figure 1 allegedly should be designated by a legend such as "Prior Art."

Claims 1, 4, 5, 7 and 11 stand rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by Takumi (JP 05-047972) (hereinafter "Takumi").

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Takumi in view of Yoshida et al. (U.S. Patent No. 4,039,114) (hereinafter "Yoshida").

Claim 6 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Takumi in view of Miyaguchi et al. (U.S. Patent No. 5,508,740) (hereinafter "Miyaguchi").

Claims 8-10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Takumi in view of Yoshida.

Summary of the Response to the Office Action

Applicants have amended claims 1 and 7 to differently describe embodiments of the disclosure of the instant application, claims 2 and 9 have been amended to be rewritten in independent form. The dependencies of claims 4-6 have been amended to now be dependent on newly-amended independent claim 2 and the dependencies of claims 8 and 11 have been amended to now be dependent on newly-amended independent claim 9. Accordingly, claims 1-11 remain currently pending for consideration. Paragraphs [0002] and [0003] of the specification, as well as the abstract, have been newly-amended to improve their form. Also, a

IN THE DRAWINGS:

Attached is a Submission of Replacement Drawing Sheets including a change to Fig. 1. These Replacement Drawing Sheets, which include all of Figs. 1-6C in this application, replace the previously-filed drawing sheets. In these Replacement Drawing Sheets, Fig. 1 has been amended to include the legend "PRIOR ART" in response to the Examiner's requirement at page 2, section 2 of the Office Action.

Submission of Replacement Drawing Sheets is concurrently filed incorporating an amendment to Fig. 1.

Objection to the Disclosure

The disclosure stands objected to for alleged informalities. Applicants have amended the disclosure by incorporating the Examiner's helpful suggested amendments at page 2, section 1 of the Office Action. Accordingly, Applicants respectfully request that the objection to the disclosure, and the associated requirement for correction, be withdrawn.

Objection to the Abstract

The abstract is objected to for exceeding the 150 word limit. Applicants have amended the abstract by editing the abstract to be within the 150 word limit. Accordingly, Applicants respectfully request that the objection to the abstract, and the associated requirement for correction, be withdrawn.

Objection to the Drawings

The drawings are objected to because Figure 1 allegedly should be designated by a legend such as "Prior Art." In the Submission of Replacement Drawing Sheets filed concurrently herewith, Applicants have amended the drawings by labeling Fig. 1 as "Prior Art" in response to the drawing objection in response to the Examiner's requirement at page 2, section 2 of the Office Action. Accordingly, Applicants respectfully request that the objections to the drawings be withdrawn.

Rejection under 35 U.S.C. §§ 102(b) and 103(a)

Claims 1, 4, 5, 7 and 11 are rejected under 35 U.S.C. § 102(b), as being anticipated by Takumi. Claims 2 and 3 are rejected under 35 U.S.C. § 103(a), as being unpatentable over Takumi in view of Yoshida. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takumi in view of Miyaguchi. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takumi in view of Yoshida.

Applicants have amended claims 1 and 7 to differently describe embodiments of the disclosure of the instant application, claims 2 and 9 have been amended to be rewritten in independent form. The dependencies of claims 4-6 have been amended to now be dependent on newly-amended independent claim 2 and the dependencies of claims 8 and 11 have been amended to now be dependent on newly-amended independent claim 9. To the extent that these rejections might be deemed to still apply to claims 1-11 as newly-amended, they are respectfully traversed for at least the following reasons.

Claim 1 has been newly-amended to emphasize a structural difference between the claimed semiconductor substrate and the semiconductor substrate (1) of Takumi. In a similar way, independent claim 7 has also been newly-amended so as to clarify the structure of the semiconductor substrate to be prepared. Applicants respectfully submit that independent claims 1 and 7 of the instant application each include a newly-described feature that the front surface of the semiconductor substrate is provided with a depressed portion to reduce the thickness of the semiconductor substrate. Applicants respectfully submit that the structure of the semiconductor substrate with a depressed portion is particularly effective to cool the CCD reading part on its back surface. In contrast, Applicants respectfully submit that the first principle surface (2) of Takumi is flat. As a result, Applicants respectfully submit that it can therefore be easily

understood that the structure of the claimed semiconductor substrate of the instant application can obtain a significantly larger cooling effect than the structure disclosed in Takumi.

Applicants respectfully submit that none of the cited references teach, or even suggest, such a feature. As a result, Applicants respectfully submit that the inventions defined in the respective combinations of independent claims 1 and 7 of the instant application are patentable over the cited references.

Turning now to newly-amended independent claims 2 and 9, Applicants respectfully submit that independent claims 2 and 9 describe respective advantageous combinations of features that include a working opening for wire-bonding the package terminals and the electrode pads on the semiconductor substrate. Applicants note that it is clear that neither of the Office Action's applied Takumi and Yoshida references teach, or even suggest, such a feature. In particular, Applicants respectfully submit that Yoshida relates to a wire bonder, and its technical field is clearly different from that of the claimed invention because the technical field of the claimed invention relates to photodetection device and packaging structure.

In concrete terms, for example, Applicants respectfully submit that the photodetection device as claimed in independent claim 1 of the instant application has a working opening (2c) at the position corresponding the electrode pads on the cavity bottom of the package and the package terminals. Applicants note that this advantageously makes it possible to effectively wire-bond the electrode pads on the semiconductor substrate and the package terminals while the semiconductor substrate is housed in the package.

In contrast, Applicants respectfully submit that the glass tube 9 of Takumi, corresponding to the "package" as characterized by the Examiner, does not have a structure corresponding to the claimed working opening. The "package" as characterized by Examiner is a glass tube 9

constituting a vacuum-sealed dewar. Applicants respectfully submit that if an opening is formed on a glass tube holding a high vacuum condition, a person of ordinary skill in the subject art would clearly understand that the airtightness of the glass tube decreases and its glass strength also decreases. Therefore, Applicants respectfully submit that a person of ordinary skill in the subject art would not typically be led to employ such a structure.

Even further, Applicants respectfully submit that it can be considered that the structure shown in Fig. 2 of Takumi is obtained by housing the assembly of Fig. 1(b) in the glass tube after bonding the inner metal lead 5 and the semiconductor substrate 1 with the wire 7. In this case, Applicants note that a working opening, as described in claims 2 and 9 of the instant application, is not necessary.

On the other hand, Applicants respectfully submit that Yoshida relates to a wire bonding equipment for wire-bonding electrodes on a semiconductor element and feed-out electrodes, and is characterized by a semiconductor element supporting structure (jig structure) added with an artifice in order to increase an alignment accuracy between the wire bonding equipment itself and the semiconductor element. Applicants respectfully submit that Yoshida does not teach, or even suggest, an idea in that a semiconductor element and an electrode pad are wire-bonded while the semiconductor element is housed in a package. At least, in considering the structure of the equipment described in Yoshida such as the jig (5), (6), (7), (8) and the wire bonder (13), which are arranged in an open space out of the main support base (27), Applicants note that it can be easily understood by those having skill in the subject art that a working opening as described in independent claims 2 and 9 of the instant application is not necessary in such an arrangement. That is, Applicants respectfully traverse the Examiner's assertion in the Office Action in this regard as being technically incorrect.

Accordingly, Applicants respectfully assert that the rejections under 35 U.S.C. §§ 102(b) and 103(a) should be withdrawn because Takumi does not teach or suggest each feature of independent claims 1 and 7 of the instant application, as newly-amended. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)." Also, Takumi and Yoshida, whether taken separately or in combination, do not teach or suggest each feature of independent claims 2 and 9 of the instant application, as newly-amended. In this regard, MPEP § 2143.03 instructs that "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)."

Furthermore, Applicants respectfully assert that the dependent claims 3-6, 8 and 10-11 are allowable at least because of their dependence from independent claim 1 or 9, and the reasons discussed previously. With regard to the additionally applied reference to Miyaguchi with regard to dependent claim 6, Applicants respectfully submit that this additionally applied reference does not cure the deficiencies discussed previously with regard to Takumi and Yoshida.

CONCLUSION

In view of the foregoing, Applicants submit that the pending claims are in condition for allowance, and respectfully request reconsideration and timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this

response, the Examiner is invited to contact Applicants' undersigned representative to expedite prosecution. A favorable action is awaited.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

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